

Claims:

1 1. A method for operating a receiver to receive data
2 from a transmitter across a wireless link, the method
3 comprising:

4 receiving, by a physical layer operating on the
5 receiver, a physical layer frame from the transmitter across
6 the wireless link, wherein receiving the physical layer frame
7 includes:

8 determining whether the physical layer frame is
9 error free;

10 when the physical layer frame is error free,
11 acknowledging to the transmitter a successful receipt,
12 extracting a packet data unit from the physical layer
13 frame, and passing the packet data unit to a link layer
14 operating on the receiver; and

15 when the physical layer frame is not error free,
16 negatively acknowledging to the transmitter a successful
17 receipt; and

18 receiving, by the link layer operating on the receiver,
19 a packet data unit, wherein receiving the packet data unit
20 includes:

21 determining whether a packet data unit is lost; and

22 when the packet data unit is lost, delaying an
23 automatic retransmission request for a lost packet data
24 unit for a delay period corresponding to an error

25 recovery operation at the physical layer for the lost
26 packet data unit.

1 2. The method of claim 1, wherein the delay period
2 corresponds to N attempts to successfully receive a physical
3 layer frame containing the lost packet data unit, and wherein
4 N is an integer.

1 3. The method of claim 1, wherein:
2 the transmitter is a base station; and
3 the receiver is a mobile station.

1 4. The method of claim 1, wherein:
2 the transmitter is a mobile station; and
3 the receiver is a base station.

1 5. The method of claim 1, wherein determining whether
2 a packet data unit is lost includes comparing the sequence
3 number of a received packet data unit to the sequence number
4 of an expected packet data unit.

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1 6. A method for operating a transmitter to transmit
2 data to a receiver across a wireless link, the method
3 comprising:

4 passing a packet data unit from a link layer operating
5 on the transmitter to a physical layer operating on the
6 transmitter;

7 packaging the packet data unit into a physical layer
8 frame;

9 transmitting the physical layer frame to a receiver
10 across the wireless link;

11 awaiting an indication of successful receipt of the
12 physical layer frame from the receiver;

13 when an indication of a successful receipt of the
14 physical layer frame is not received, initiating
15 retransmission of the physical layer frame;

16 if the indication of successful receipt of the physical
17 layer frame is not received after at least one retransmission
18 attempt, notifying the link layer that the packet data unit
19 is lost; and

20 the link layer initiating error recovery operations for
21 the packet data unit that is lost.

1 7. The method of claim 6, wherein N-1 retransmission
2 attempts of the physical layer frame are attempted, and
3 wherein N is an integer.

1 8. The method of claim 6, wherein:
2 the transmitter is a base station; and
3 the receiver is a mobile station.

1 9. The method of claim 6, wherein:
2 the transmitter is a mobile station; and
3 the receiver is a base station.

1 10. The method of claim 6, wherein the link layer
2 comprises a radio link protocol layer.

1 11. A wireless receiver that operates to receive data
2 from a wireless transmitter across a wireless link, the
3 wireless receiver comprising:

4 an antenna;

5 a radio frequency unit coupled to the antenna; and

6 at least one digital processor coupled to the radio
7 frequency unit that executes software instructions causing
8 the wireless receiver to:

9 receive a physical layer frame from the wireless
10 transmitter across the wireless link, wherein receiving the
11 physical layer frame includes:

12 determining whether the physical layer frame is
13 error free;

14 when the physical layer frame is error free,

15 acknowledging to the wireless transmitter a successful
16 receipt, extracting a packet data unit from the physical
17 layer frame, and passing the packet data unit to a link
18 layer operating on the wireless receiver; and

19 when the physical layer frame is not error free,
20 negatively acknowledging to the wireless transmitter a
21 successful receipt; and

22 receive, by the link layer operating on the wireless
23 receiver, a packet data unit, wherein receiving the packet
24 data unit includes:

25 determining whether a packet data unit is lost; and

26 when the packet data unit is lost, delaying an
27 automatic retransmission request for a lost packet data
28 unit for a delay period corresponding to an error
29 recovery operation at the physical layer for the lost
30 packet data unit.

1 12. The wireless receiver of claim 11, wherein the
2 delay period corresponds to N attempts to successfully
3 receive a physical layer frame containing the lost packet
4 data unit, and wherein N is an integer.

1 13. The wireless receiver of claim 11, wherein
2 determining whether a packet data unit is lost includes
3 comparing the sequence number of a received packet data unit

4 to the sequence number of an expected packet data unit.

1 14. The wireless receiver of claim 11, wherein the link
2 layer comprises a radio link protocol layer.

1 15. The wireless receiver of claim 11, wherein:
2 the wireless receiver is a mobile station; and
3 the wireless transmitter is a base station.

1 16. The wireless receiver of claim 11, wherein:
2 the wireless receiver is a base station; and
3 the wireless transmitter is a mobile station.

1 17. A wireless transmitter that operates to transmit
2 data to a wireless receiver across a wireless link, the
3 wireless transmitter comprising:

4 an antenna;

5 a radio frequency unit coupled to the antenna; and

6 at least one digital processor coupled to the radio
7 frequency unit that executes software instructions causing
8 the wireless receiver to:

9 pass a packet data unit from a link layer operating

10 thereon to a physical layer operating thereon;

11 package the packet data unit into a physical layer

12 frame;

13 transmit the physical layer frame to the wireless
14 receiver across the wireless link;

15 await an indication of successful receipt of the
16 physical layer frame from the wireless receiver;

17 when an indication of a successful receipt of the
18 physical layer frame is not received, initiate
19 retransmission of the physical layer frame;

20 if the indication of successful receipt of the
21 physical layer frame is not received after at least one
22 retransmission attempt, notify the link layer that the
23 packet data unit is lost; and

24 cause the link layer to initiate error recovery
25 operations for the packet data unit that is lost.

1 18. The wireless transmitter of claim 17, wherein N-1
2 retransmission attempts of the physical layer frame are
3 attempted, and wherein N is an integer.

1 19. The wireless transmitter of claim 17, wherein the
2 link layer comprises a radio link protocol layer.

1 20. The wireless transmitter of claim 17, wherein:
2 the wireless transmitter is a base station; and
3 the wireless receiver is a mobile station.

1 21. The wireless transmitter of claim 17, wherein:
2 the wireless transmitter is a mobile station; and
3 the wireless receiver is a base station.